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SUNBIRDS AND HUMMING-BIRDS

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(*With six text figures*)

Over a great part of the world, in the eastern as well as the western hemisphere but more abundantly in the tropics, are found some birds notable for their very small size, which are chiefly adapted to feed from flowers and consequently concerned with their pollination and the natural spreading of plants. In the Old World these are the Sunbirds (family Nectariniidae); in the New World the Humming-birds (family Trochilidae). Although they represent two quite distinct avian types and show highly divergent phylogenetic affinities, they are very often confused owing to the apparent similarity both in their morphology and their biology. But the sunbirds exhibit all the characteristics of a true passerine type, while the humming-birds are more closely related to the picarian type. In the old classifications they were generally associated together, an arrangement now considered to be entirely unwarranted and out of date.

The similarities, of course strictly superficial and adaptative, are:

1. In the reduction of size, the largest sunbird (the West African *Dreptes thomensis*) being about the size of a sparrow, the largest humming-bird (the Andean *Patagona gigas*) that of a swift. The smallest sunbirds (the South Indian *Cinnyris minimus* and the West African *Cinnyris minullus*) scarcely exceed the size of a common bumble-bee, the smallest humming-birds being still more diminutive, the Cuban Hummer *Calypte helenae* being the smallest of all known birds.

2. In the shape of the bill, which is thin from the base, tubular, more or less elongated (the 'Sabre Humming-bird', *Ensifera ensifera*, possesses the longest bill compared to general size among all birds), acutely pointed, either straight or downcurved, or even upturned in some humming-birds. In close correlation with such a type of bill, the tongue is very long, thin, more or less protractile and tubular, bifid at the distal end, and used by the birds for obtaining their nectar food.

3. In the brilliancy of plumage, at least among the adult males, since sexual dimorphism is a most frequent but not absolute rule in

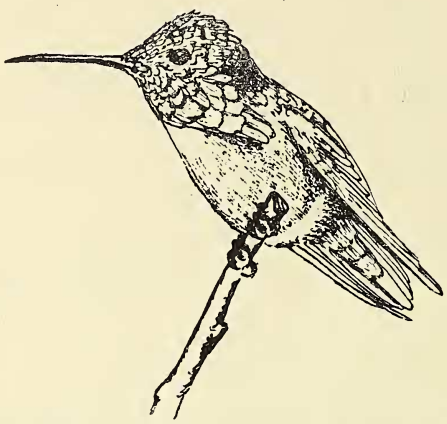

Fig. 1. One of the smallest known birds: Costa's Humming-bird (*Calypte costai* ♂).

both groups. The most highly differentiated feathers have often a scale-like appearance and a peculiar microstructure, which is the origin of the iridescent gloss and varied effects of light-rays, for which these little creatures are celebrated from olden times as some of the most handsome and beautiful of all animals.

But, when examined more closely, and particularly from their anatomical and morphological structure, both types of birds show obvious distinctions which make them in fact very easy to differentiate comparatively, not only in the hand but also in nature.

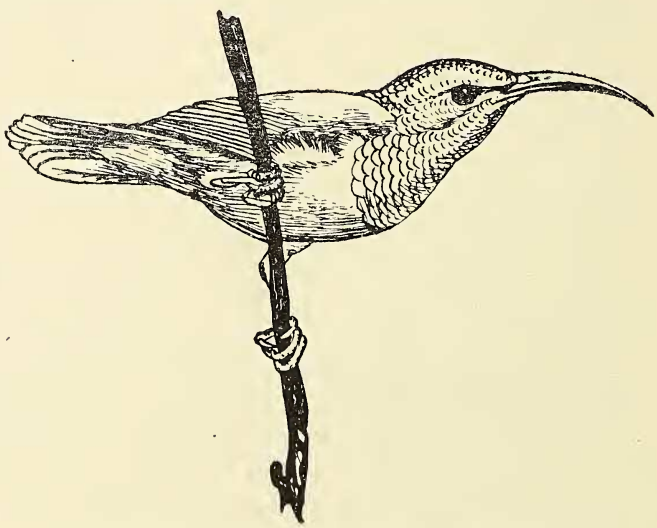

Fig. 2. An African Sunbird: *Cyanomitra verticalis* ♂.

The wings, tail and legs are quite differently shaped. Although in both groups the number of primaries remains the same—ten—the wing of the sunbird has the common, rounded structure of the passerine type, with the third and fourth primaries the longest. In the humming-bird, the wing is quite peculiarly oar-shaped, with a reduced number of secondaries, a very short humerus, and the first primary the longest (exceptionally the second). The tail in the sunbirds, typically passerine, is always composed of twelve rectrices, all of them normally shaped even if elongated; in the humming-birds, the tail has only ten rectrices, several of which are in some cases extremely differentiated compared with the normal type. The legs of the sunbirds are the normal legs of passerine birds, with comparatively long tarsi; in the humming-birds, the tarsi are greatly shortened, their strength varying in accordance with the several types, generally with very sharp claws.

The tongue, long and bi-tubular in both groups, a feature closely correlated with their way of feeding, shows an embryonic and anatomic development which is not the same in both of them.

The metallic feathers themselves, in spite of the similarity of their glossy tints, are quite different in either group, even from their external appearance and still more so from their microstructure when viewed under a strong lens. On the whole, if the various shades of green seem to be the most generalised ground-colour in both groups, it is quite obvious that this metallic colouring varies distinctively within each of them, the plumage of the sunbirds often exhibiting, besides the metallic appearance, some bright pigment-colouring such as red or yellow, which is entirely unknown among humming-birds.

Sexual dimorphism occurs as a rule among the sunbirds with but very few exceptions: in this family the females never become really andromorphic, but in several species the male retains a dull gynemorphic

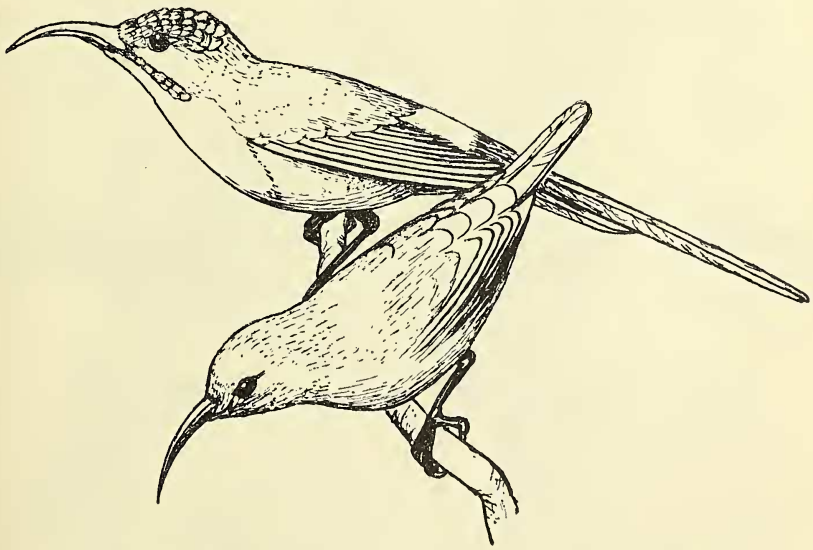

Fig. 3. An Asiatic Sunbird: *AEthopyga siparaja* ♂ and ♀.

appearance. In this regard the humming-birds exhibit a much more varied tendency. Both sexes are sometimes very much alike, and this not only among the dullest, but also among the most brilliant of them, as for example the 'Rainbow', *Panterpe insignis,* from Costa-Rica, and the Antillean *Eulampis jugularis.*

Food and Habits

In their way of life, the search and the quality of the food are the most prominent features which make these two types of birds so often and so easily confused by people who are not specialists in ornithology. Both groups take their food chiefly from flowers and are well known as frequenting freely gardens and all kinds of cultivated areas where they may find an abundance of flowers. Therefore they have rapidly become familiar and popular animals even in the big towns: the sunbirds in Africa and Asia, the humming-birds in America.

But, if these birds are so much attracted to flowers, it is not exclusively in quest of their natural liquid secretions as was formerly believed, but also for catching the many tiny insects which are to be found inside the floral envelopes, which are themselves attracted by those secretions. It is a well-established fact now that the animal food is still more necessary to them than the vegetarian one, and in fact all of them are also quite capable of catching their animal prey on the wing, such as flying insects or small spiders from their webs. While exploring the flowers for their food, sunbirds generally hang on the flower itself or nearby, but may eventually hover before it with rapid wing-beats. It is the reverse with the humming-birds; a few of them are said to feed when sitting on the flowers, but the great majority take their food by hovering in front of them, introducing their long and thin bills inside the corollas and rapidly visiting flower after flower without alighting for a single moment.

Owing to the varied and often peculiar shape of the bill, several species of sunbirds and humming-birds have been considered as strictly adapted to feed, each of them, from one special kind of flower, the

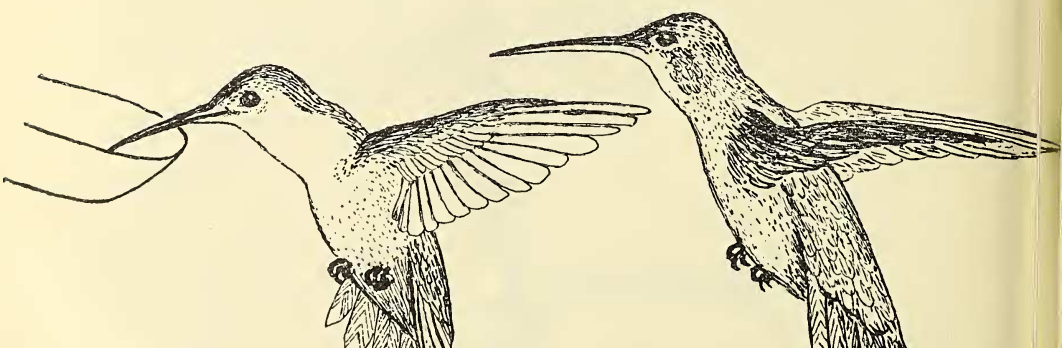

Fig. 4. Female Rubythroated Humming-birds in flight for drinking.

shape of which suits them best. As a matter of fact, from more recent and accurate observations, it seems that there are only very few cases of direct relationship between the species of plants and the species of birds visiting them, and mostly these visits remain only connected with seasonal changes or opportunities.

While the sunbirds are able to change their mode of flight variously according to circumstances, exactly as do other passerine birds, the more specialized humming-birds possess only one most peculiar way of flying, in close accordance with the peculiarities of the wing-structure and the shortness of the humerus, and from this they derive their popular name. It is a 'humming' flight consisting of uninterrupted, regular and very rapid wing-beats (up to 50 per second for the smallest species), which is rather similar to the flight of several types of moths (Sphingidae) and makes the latter easily confused with the birds in the countries where they occur side by side. On the other hand, humming-birds are the only birds which add to this peculiar, unique, mode of flight the ability of flying backwards quite as well as in any other direction. This singularity gives to them an unrivalled power of motion in the air, which contrasts strongly with the disability of their very short legs even to move on a branch.

If we now consider the biology of the reproduction cycle, it appears clearly that the two groups of birds diverge noticeably from each other. Sunbirds are seemingly, during the nesting season, mostly monogamous birds. The female is undoubtedly the only sex that occupies itself with the building of the nest and with incubation, but the male appears in most cases to take part in the feeding and rearing of the young and helping the female in the accomplishment of this

Fig. 5. Female Rufous Humming-bird sitting on nest.

duty. Male humming-birds on the other hand are polygamous. Both sexes live quite apart from each other, except for the act of mating, often even widely separated in space as well as season of the

year. In no case, as far as is known, does the male ever take the least part in the building of the nest or the rearing of the young, the female undertaking these very tiresome duties entirely by herself.

In both sunbirds and humming-birds the nests are most delicate and well worked-out structures, built chiefly with vegetal matter such as moss or very tiny twigs, associated with vegetable down and adhesive threads taken from spiders' webs. But the sunbirds always build closed, hanging, pear-shaped nests with a lateral entrance, mostly placed among bushes or tree-branches, often at the end of a branch. Humming-birds always build open, more or less cup-shaped nests, placed in most cases on branches or twigs, but often too on the most unexpected supports such as cave-walls or even human apparatus. In either group the normal clutch is composed of two eggs only, very seldom one or three. While the humming-birds invariably lay uniformly white eggs, somewhat elongate in shape and rather big compared to the size of the birds, the eggs of sunbirds exhibit the most handsome variety of colouring and pattern, being generally more or less adorned with dark frecklings or patches or stripes on a light ground of whitish, pinkish or bluish, and sometimes quite glossy.

Although the nests of the sunbirds are domed, with a rather narrow entrance, they are often parasitized, in Africa as well as in Asia, by several of the smaller species of cuckoos. Nothing similar of course

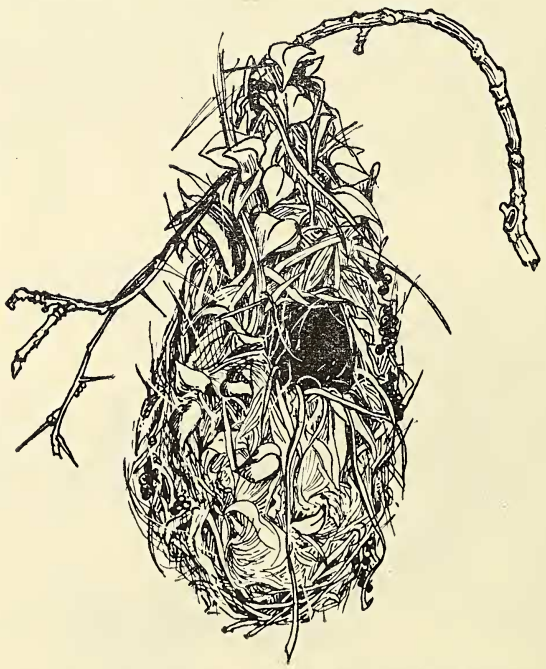

Fig. 6. Nest of an Indian Sunbird: *Cinnyris asiatica.*

occurs with the humming-birds, but we must not forget that in America the brood-parasitism of the cuckoos is far less developed than among their old-world cousins.

Habitat and Geographical Distribution

Sunbirds are to be found in all tropical and sub-tropical parts of the Old World, even in the deserts and on the high mountains. But, although some of them are able to accomplish a certain amount of changes in their habitat seasonally, none is known as a true migratory bird, and their travels never go beyond the limits of the warm areas where they can find flowers and insects all the year around. Many of them are quite sedentary and breed at any time of the year without a definite season.

Their northern limits of general distribution are Syria, the Himalayas and Southern China. They are especially numerous in tropical and southern Africa, but do not occur in north-western Africa. Not more than one-third of the species live in south-eastern Asia and the Malayan region, very few of them reaching even New Guinea and Australia. The Solomon Islands and Queensland are the most easterly limit of their geographical distribution.

In Africa, every kind of habitat generally possesses its own characteristic species of sunbirds: several of these are unknown except in the heavily forested, humid parts of the lowlands, as for example the magnificent *Cinnyris superbus* in West Africa. Some others, as for example *Nectarinia metallica* of the Sudan, are partial to very dry, sunny and even desert areas, where the flowering *Acacia* trees remain their favourite haunts and afford them most of their food. Others, as for example *Drepanorhynchus reichenowi* of East Africa, are strictly confined to high mountain slopes where frequent mist and rain entertain luxuriant vegetation. A certain number of species are however much more widely spread and may show, as does *Cinnyris cupreus*, much less partiality for any special kind of environment. In the drier districts the typical species very often exhibit a seasonal change in the plumage of the male ('eclipse'), which during the dry season appears more or less like the dull female. Such a change seemingly does not occur among the species living in more humid areas.

In India, the various species are mostly less specialised as regards their habitats and a few of them, for example *Cinnyris asiatica*, exhibit a similar seasonal change of the plumage as the African ones, but probably with much less regularity. In any case, all the sunbirds, whether in Africa or in Asia, are always rapidly attracted to gardens and the extension of the latter is generally followed by the spreading of the former, even into areas which from their natural conditions would seem rather unsuitable for the birds.

The humming-birds are a typically American group of birds, containing nearly twice as many different species as the sunbirds. But, owing to their strong power of flight and their speed, several species of North America are well-known to perform extensive and regular annual migrations, being found during the spring and early summer months as far north as Alaska and Labrador and wintering mostly in Mexico and Central America. To the south, humming-birds are spread all over the South American continent down to Tierra del Fuego, a few southern species also being migratory. They exist on most islands of the Neotropical Region: West Indies, Juan Fernandez, but not in the Galapagos. However, Central America and the Andean countries

(Columbia, Ecuador, Peru) are certainly the richest of all in numbers of species, and here they are encountered at all elevations.

Like the sunbirds, and perhaps still more, humming-birds may be found in every kind of biotope, from the most barren areas, where the flowers and even fruits of Cacti remain their chief, though precarious food resource, to the heaviest rain forest, becoming rapidly adapted to cultivated country as well. Several species live the whole year round in the high mountain ranges of the equatorial zone, close to the perpetual snow, amongst extremely poor life-conditions. Although some of them are obviously partial to very dry areas, seasonal changes of plumage—at least of regular occurrence—have not yet been definitely recorded for any species.

It may be added that these tiny birds, when living in close contact with human settlements, may become the tamest and most fearless birds in existence, to the extent of nesting inside freely opened and daily frequented rooms without the least apparent disturbance.

As a conclusion, it may be interesting to point out once more, from a general biological point of view, the close parallelism in the evolution of these two very different avian types—the humming-birds in America and the sunbirds in the Old World. But, from their morphological affinities, it must not be forgotten that the former constitute a highly specialized and differentiated group of birds, with well defined limits and no near allies. This is far from the case with the sunbirds, which are in fact closely allied to some other passerine types, especially the Honey-eaters (family Meliphagidae). In fact the frontier between Nectariniidae and Meliphagidae is rather unclearly defined, and the so-called 'Spider-hunters' (genus *Arachnothera* and allies) may be considered as a kind of connecting link between them.